

## DISCUSSION PAPER

### DETERMINATION OF THE LEAST ENVIRONMENTALLY DAMAGING PRACTICABLE ALTERNATIVE (LEDPA)

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- BRIDGE & THOROUGHFARE DISTRICT NO. 4  
(COLLEGE BLVD. AND CANNON ROAD)
  - CALAVERA HILLS PHASE II
  - DETENTION BASINS
- 

#### 1. Background

Purpose of the Roadway Links. The goal of the regional arterial traffic grid system of north San Diego county is to provide adequate traffic circulation at buildout of the region. This system is interdependent upon each planned arterial link. The proposed College Boulevard and Cannon Road roadway segments are important components of this regional transportation system, which are needed for the benefit of motorists residing and working throughout several cities in north San Diego county.

College Boulevard is a north-south arterial link, which will provide access for commuters from the cities of Oceanside and Vista, and from the regional SR-78 to the largest employment center in north county, located around Palomar Airport in central Carlsbad. Cannon Road provides an important east-west link, from Vista, San Marcos, Escondido, and eastern Carlsbad to western Carlsbad and the I-5 Freeway. Traffic projections show that Cannon Road will provide a parallel alternative to congested Palomar Airport Road.

College Boulevard and Cannon Road have been constructed on each end of the links proposed in this project, and as a result, these beginning and ending points of the links are geographically fixed. City of Carlsbad traffic projections indicate that the combination of Reaches B and C of College and Reach 3 of Cannon are needed in conjunction with development Calavera Hills Phase II in order to preserve acceptable roadway and intersection LOS in the area, and that College Reach A is in process with the City for construction soon thereafter. The projections indicate that Cannon Reach 4 is not needed until after year 2010. In the event that these links are not constructed, at buildout of the region, traffic projections indicate that thirty-one (31) arterial roadways in the region would become more congested, and nine (9) major intersections would reach a failure level of service.

Geographical Factors. The crossing of Agua Hedionda, Calavera and Little Encinas Creeks in the area is the most significant environmental impact associated with the roadway project. As a result of the meandering criss-cross of creek drainages throughout this area of Carlsbad, these roadway links, by necessity, must cross Agua Hedionda Creek at one location (south end of College Boulevard Reach A) and Little Encinas Creek at one location (north end College Boulevard Reach A). It is unavoidable that these two creeks will be crossed by the roadways. The necessity

and/or location of the crossing of Calavera Creek is the primary subject of this analysis of the LEDPA for the project.

## 2. Roadway Alignment Alternatives

Previous Alternatives Analysis. In the original Informational Report provided by the applicant(s) in support of the Section 404 permit for the project, eight (8) alternative alignments for the subject roadway links were analyzed. Each of these alternatives were determined to possess certain positive and negative aspects, which were listed in table form in a Conclusions Matrix. This Conclusions Matrix and map is attached to this Discussion Paper as Exhibit A.

Seven (7) of the alternatives previously addressed crossed Calavera Creek at one location or another near the northerly point of Rancho Carlsbad Mobile Home Park. The last alternative analyzed, the "No Intersection" alternative (Alternative #8), addressed a modified roadway pattern wherein College Boulevard transitions into Cannon Road, and Cannon Road transitions into College Boulevard, and no crossing of Calavera Creek occurs. Even though the analysis concluded that several unavoidable negative aspects would occur if this "No Intersection" alternative were adopted, the USF&WS has indicated in their letter to USACOE of December 3, 2001 that the Service supports this alternative in order to avoid impacts to a pair of least Bell's vireo sighted in the Calavera Creek area in 2000. Since the USF&WS has indicated their preference for the "No Intersection" alternative, this LEDPA analysis will focus of a comparison of this alternative with the project preferred alternative, which does provide an intersection at Calavera Creek.

## 3. The "No Intersection" Alternative (Alternative #8)

The Roadway Alignment Alternatives Analysis provided in the Informational Report supporting the Section 404 permit request, included the "No Intersection" alternative. Our analysis of this alternative concluded the following:

ALIGNMENT ALTER- NATIVE	WETLAND DISTURB- ANCE	POSITIVE ASPECTS	NEGATIVE ASPECTS
No Intersection Alternative #8	4.1 ac.	<ul style="list-style-type: none"><li>• Avoids impacts to Calavera Creek.</li></ul>	<ul style="list-style-type: none"><li>• No east-west arterial link is made. Surrounding arterial roadways including El Camino Real (ECR), Hwy. 78, Palomar Airport Road, Melrose Drive and College Avenue would have failing levels of service (gridlock) at regional buildout. Several intersections also would fail.</li><li>• No direct access is provided to the CUSD high school site, so a collector street would have to be installed. To meet City standards, this street would be required to cross Calavera Creek anyway.</li><li>• Greater wetlands on Little Encinas Creek, which contains the highest quality riparian habitat amongst preserved upland area.</li></ul>

Traffic Impacts Resulting from the "No Intersection" Alternative. As mentioned in the previously-submitted Informational Report, the traffic circulation inefficiency resulting from the divergence from the regional grid system through implementation of the "No Intersection" alternative will result in failing levels of service (gridlock) at buildout for several intersections on surrounding arterial roads, including El Camino Real, Palomar Airport Road, Melrose Drive, College Avenue, Tamarack Avenue and even on Hwy-78. Projections show that this alternative would also increase the peak hour turn volumes at the El Camino Real/Cannon Road intersection such that additional turn lanes (road widening improvements) would be required. These road improvements would include the widening of the existing El Camino Real bridge crossing over Agua Hedionda Creek, the widening of the existing Cannon Road bridge over Agua Hedionda Creek, and possible road widening of El Camino Real near Plaza Drive and Tamarack Avenue in order to prevent traffic failures at these intersections. Each of these widenings will impact existing wetland resources adjacent to these intersections. These are impacts not necessitated by the proposed project preferred alternative.

The significant number and scope of traffic failures projected with the "No Intersection" alternative comes as no surprise to the Traffic Engineering Department in Carlsbad. Both College and Cannon must connect to El Camino Real because of the regional traffic distribution purposes they serve. As mentioned, their north/south and east/west distribution patterns are essential to the overall grid system.

Other Significant Impacts. Although the "No Intersection" alternative would eliminate this project's impacts to Calavera Creek and the least Bell's vireo, further analysis of this alternative concludes that impacts to Calavera Creek and other vireo habitat would likely occur by other improvements that would be necessary. Improvements that would impact vireo habitat include provision of an access road to the CUSD high school site over either Calavera Creek (from the west) or Little Encinas Creek (from the east), widening of the existing Cannon Road bridge over Agua Hedionda Creek (within the Agua Hedionda Lagoon area), utility line crossings of Calavera Creek, and separate berms for the detention basins needed for flood control. Approximately two (2) acres of additional impacts to coastal sage scrub would occur beyond those associated with the preferred project alternative. As mentioned, the traffic issues resolved with the preferred project alternative would be exacerbated with the "No Intersection" alternative.

All of these changes required under the "No Intersection" alternative would significantly increase the cost of the project for what appears to be little to no gain in biological resource values, given the increased losses of quality wetland, riparian and coastal sage scrub habitats. We believe these to be significant impacts resulting from the "No Intersection" alternative, that must be taken into account by USACOE when analyzing the degree of environmental damage associated with the determination of the LEDPA.

#### 4. "Alternative H"

"Alternative H" Roadway Pattern. Through our recent investigation process, we have been advised by the traffic engineer that a new roadway pattern could be designed which could accommodate the general concept of the "No Intersection" alternative and which could eliminate the majority of the traffic failure problems associated with the "No Intersection" alternative. We have called this design "Alternative H", due to its necessity for a 4-lane connecting roadway between the two College/Cannon links, forming an "H" pattern. This "Alternative H" is shown on the attached "Alternative H Wetland Impacts" Exhibit.

The cross-road linking connection between the two College/Cannon links allows for the necessary turn movements to accommodate (albeit less efficiently) the north-south and east-west regional vehicular travel required for the pattern of commuter access discussed above. This alternative also provides for access to the high school site.

Biological Impacts of "Alternative H". As can be seen on the "Alternative H" exhibit, the goal of avoiding impacts to Calavera Creek and the vicinity of the least Bell's vireo sightings however, would not be met under the "Alternative H" design. Indeed, impacts to wetlands overall would significantly increase over the impacts associated with the preferred project alternative; 3.6 acres (preferred alternative) to 5.1 acres ("Alternative H"). Impacts to coastal sage scrub would also increase by approximately 2 acres under "Alternative H". The offsite widenings at El Camino Real, Cannon Road and other intersections would not be necessary with this alternative.

**Impact Summary Table:**

	<b>Total Wetlands Impacts</b>	<b>Avoids LBV @ Calavera Creek</b>	<b>Traffic LOS Failures</b>	<b>Impacts @ Agua Hedionda Lagoon</b>	<b>CSS Impacts</b>
"No Intersection" alternative	4.4 ac.	Not by this project	Yes	Yes	2 ac. more
"Alternative H"	5.1 ac.	No	No	No	2 ac. more
Preferred alternative	3.6 ac.	No	No	No	baseline

#### 5. "No Intersection" and "Alternative H" Designs Not the LEDPA

When compared to the preferred project alternative, is the conclusion of this analysis that; (a) significant traffic and additional off-site biological impacts will occur with the "No Intersection" alternative, and (b) a less efficient traffic pattern, and additional biological impacts will occur with the "Alternative H" design. As a result, we believe that neither of these two alternatives should be considered the LEDPA.

## 6. LEDPA for Location of College/Cannon Intersection

The applicants respectfully submit that the "No Intersection" alternative and the "Alternative H" designs are not the LEDPA, since the "No Intersection" alternative is not practicable nor less environmentally damaging, and the "Alternative H" is not less environmentally damaging. Based on this finding, it must be concluded that a crossing of College Boulevard and Cannon Road (College/Cannon intersection) must occur. From this conclusion, the question of the LEDPA for the optimum location of the College/Cannon intersection must be decided. The preferred project alternative places this location at the closest feasible point to the existing Rancho Carlsbad Mobile Home Park (See attached Intersection Alternative Analysis). Moving the intersection to the south or west is infeasible without demolishing existing mobile home park uses. Moving the intersection to the north or east will result in impacts to a longer segment of Calavera Creek, and potentially push Basin BJ further into the Little Encinas Creek riparian corridor. This information was previously provided in the Intersection Location Alternative Analysis submitted with the previous Informational Report.

Notwithstanding the fact that the preferred project alternative places the College/Cannon intersection at the location where the pair of least Bell's vireo were sighted, on balance, this analysis concludes that the preferred project intersection location is the LEDPA.

## 7. Cannon Road Reach 4

No Certification of Reach 4 East. On January 2, 2002, the Carlsbad Planning Commission voted to recommend to the City Council that they certify the FEIR for the project, with the exception of the eastern, approximately one mile portion of Cannon Road Reach 4 (called Reach 4B). Specifically all of the other reaches of the roadways would be certified for compliance with CEQA, but only the westerly 1200 feet (to provide access to the high school site) of Reach 4 (called Reach 4A). Reach 4B was determined by the Planning Commission to necessitate additional design and environmental review prior to certification. It is neither the City of Carlsbad's nor the City of Oceanside's plan to eliminate this Reach 4B. Specific design and noise matters however, will need to be worked out between the two jurisdictions prior to future CEQA certification. This section of Reach 4 is not yet funded, and is projected to not be needed until after Year 2010.

Were the intersection to not occur (and College Boulevard Reach B transition directly to Cannon Road Reach 3), then College Reach A would have nowhere to connect to, and access to properties in the vicinity of the Reach A would be inaccessible. Further, all the commuter benefits of the College north-south traffic distribution line would be eliminated.

## **8. Calavera Phase II Residential Development**

Wetland impacts associated with the proposed project are primarily a result of the College Boulevard and Cannon Road roadway links. Only 0.1 acres of wetland and 0.2 acre of jurisdictional waters (0.3 acre total) of impacts is proposed as a result of the Phase II development. These impacts are a result of redistribution of the allowable land uses and reallocation of the residential units in order to achieve the habitat conservation corridor requested by USF&WS and CDF&G through the center of Calavera Hills. In order to provide this open space corridor, these impacts cannot be avoided if provision of the housing units is to proceed.

Given the small amount of wetland impacts for over 700 proposed units, our investigation concludes that no appropriate off-site locations exist within the vicinity which could accommodate the same sized project, and at the same time result in fewer wetland impacts. The southeast quadrant of Carlsbad includes a property of similar size, however a greater amount of jurisdictional wetlands occurs on this property, and would result in a greater amount of impacts. Several smaller properties in southwest Carlsbad could be accumulated together, however again, a greater amount of wetlands occur within the site(s), and a greater amount of wetland impacts would be anticipated from similar development of these properties. Oceanside has no available land with similar land use designation, to accommodate the project.

## **9. Detention Basins**

The proposed Detention Basins BJ and BJB, as designed, do not impact wetland resources.

## **10. Conclusion**

It is the conclusion of this analysis that the proposed project is the proposed project, as designed, is the LEDPA.

### **Attachments:**

- Exhibit A: Roadway Alignment Alternatives Conclusions Matrix  
Roadway Alginment Alternative Map
- "Alternative H" Wetland Impacts
- Intersection Location Alternative Analysis

**EXHIBIT A** *Previously-Submitted*  
**COLLEGE BLVD. / CANNON ROAD**  
**ROADWAY ALIGNMENT ALTERNATIVES ANALYSIS CONCLUSIONS MATRIX**

ALIGNMENT ALTERN- ATIVE <sup>1</sup>	WETLAND DISTURB- ANCE	POSITIVE ASPECTS	NEGATIVE ASPECTS
Cannon #1 with College #4 <sup>2</sup>	3.4 Ac.	<ul style="list-style-type: none"> <li>• Good access to High School site along southern boundary of site.</li> <li>• Consistent with ROW already dedicated on College Reach A.</li> </ul>	<ul style="list-style-type: none"> <li>• Requires high retaining wall on Cannon Reach 4 to avoid Little Encinas Creek wetlands.</li> </ul>
Cannon #1 with College #5	3.5 ac.	<ul style="list-style-type: none"> <li>• Straighter College roadway alignment.</li> </ul>	<ul style="list-style-type: none"> <li>• Requires modification to already-dedicated ROW for College Reach A. Additional costs for purchase of new ROW expected.</li> <li>• Significantly greater wetlands impacts at College/Cannon intersection.</li> <li>• Steeper roadway alignment but can meet City safety standards.</li> </ul>
Cannon #1 with College #6	3.5 ac.		<ul style="list-style-type: none"> <li>• Significantly greater amounts of grading necessary on College Reach C. Environmental and high cost impacts will result.</li> <li>• Requires modification to already-dedicated ROW for College Reach A. Additional costs for purchase of new ROW expected.</li> </ul>
Cannon #2 with College #4	3.7 ac.	<ul style="list-style-type: none"> <li>• Consistent with ROW already dedicated on College Reach A.</li> </ul>	<ul style="list-style-type: none"> <li>• Slightly greater wetlands impacts on Cannon Reach 4.</li> <li>• Cannon Reach 3 has greater impact on Robertson Ranch developable area which will result in additional acquisition costs.</li> </ul>
Cannon #2 with College #5	3.8 ac.	<ul style="list-style-type: none"> <li>• Straighter College roadway alignment.</li> </ul>	<ul style="list-style-type: none"> <li>• Greater wetlands impacts on Cannon Reach 4.</li> <li>• Cannon Reach 3 has greater impact on Robertson Ranch developable area which will result in additional acquisition costs.</li> </ul>
Cannon #2 with College #6	3.8 ac.		<ul style="list-style-type: none"> <li>• Excessive grading needed to make grades at north end of College alignment.</li> <li>• High construction costs due to more extensive grading.</li> <li>• Negatively impacts High School site.</li> <li>• Longitudinal impact and no buffer to wetlands. Greater buffer results in more impact to High School site.</li> <li>• Greater wetlands impacts at Cannon Reach 3.</li> <li>• Adversely affects potential to construct detention basin for flood control.</li> <li>• Cannon Reach 3 has greater impact on Robertson Ranch developable area which will result in additional acquisition costs.</li> </ul>

<sup>1</sup> Only alignment alternatives which can comply with safety design of maximum 10° intersection tangent included in analysis.

<sup>2</sup> Preferred Alternative

ALIGNMENT ALTERN- ATIVE <sup>3</sup>	WETLAND DISTURB- ANCE	POSITIVE ASPECTS	NEGATIVE ASPECTS
Cannon #3 with College #6	6.3 ac.	<ul style="list-style-type: none"> <li>• Avoids isolated wetlands on Robertson Ranch Cannon Reach 3 near El Camino Real.</li> <li>• No impact to existing church parking lot at existing improvements east end of Cannon Reach 3.</li> </ul>	<ul style="list-style-type: none"> <li>• Excessive grading needed to make grades at north end of College alignment.</li> <li>• High construction costs due to more extensive grading.</li> <li>• Negatively impacts High School site.</li> <li>• Longitudinal impact and no buffer to wetlands. Greater buffer results in more impact to High School site.</li> <li>• Adversely affects potential to construct detention basin for flood control.</li> <li>• Significant impacts to Little Encinas Creek wetlands on Cannon Reach 3.</li> <li>• Cannon Reach 3 bifurcates Robertson Ranch which will result in additional acquisition costs.</li> </ul>
Cannon #3 with College #7	6.6 ac.	<ul style="list-style-type: none"> <li>• Avoids isolated wetlands on Robertson Ranch Cannon Reach 3 near El Camino Real.</li> <li>• No impact to existing church parking lot at existing improvements east end of Cannon Reach 3.</li> </ul>	<ul style="list-style-type: none"> <li>• Requires 100% modification to already-dedicated ROW for College Reach A. High costs for purchase of new ROW expected.</li> <li>• Does not connect to existing improvements under construction at College Reach A.</li> <li>• Excessive grading needed to make grades at north end of College alignment.</li> <li>• High construction costs due to grading.</li> <li>• Negatively impacts High School site.</li> <li>• Longitudinal impact and no buffer to wetlands along High School site. Greater buffer results in impact to High School site.</li> <li>• Long bridge crossing (high \$) needed due to diagonal crossing at Agua Hedionda Creek on College Reach A.</li> <li>• Significant impacts to Little Encinas Creek wetlands on Cannon Reach 3.</li> <li>• Cannon Reach 3 bifurcates Robertson Ranch which will result in additional acquisition costs.</li> <li>• Small impact to Nature Preserve mitigation bank property.</li> </ul>
No Intersection Alternative #8	4.1 ac.	<ul style="list-style-type: none"> <li>• Avoids impacts to Calavera Creek.</li> </ul>	<ul style="list-style-type: none"> <li>• No east-west arterial link is made. Surrounding arterials roadways including El Camino Real (ECR), Hwy. 78, Palomar Airport Road, Melrose Drive and College Avenue would have failing levels of service (gridlock) at regional buildout. Several intersections also would fail.</li> <li>• No direct access is provided to the CUSD high school site, so a collector street would have to be installed. To meet City standards, this street would be required to cross Calavera Creek anyway.</li> <li>• Greater wetlands on Little Encinas Creek, which contains the highest quality riparian habitat amongst preserved upland area.</li> </ul>

<sup>3</sup> Only alignment alternatives which can comply with safety design of maximum 10° intersection tangent included in analysis.



**ROADWAY ALIGNMENT ALTERNATIVES ANALYSIS**  
**BTD # 4 (Revised Project)**

Roadway Combination <sup>1</sup>	Wetlands / Waters Impacts <sup>2</sup>	Impacts to Year 2000 LBV Sighting Location <sup>3</sup>	Noise Impacts to Year 2000 LBV Sighting Location	Access to High School site	Regional Traffic LOS Failures	Impacts to Agua Hedionda Lagoon	CSS Impacts (Roadways only)	Future Cannon Rd. Reach 4B Wetlands / Waters Impacts <sup>4</sup>	Other Considerations
1. Cannon #1 with College #4 (Preferred Alternative)	3.7 ac.	Yes	Yes	Yes	No	No	10.4 ac.	0.3 ac.	
2. Cannon #1 with College #5	3.9 Ac.	Yes; Also leaves 300 ft. isolated riparian island not counted as impact.	Yes	Yes	No	No	10.3 ac.	0.3 ac.	Additional costs for ROW. Basin BJB backs up into Little Encinas Creek
3. Cannon #1 with College #6	3.9 ac.	Yes	Yes	Yes	No	No	9.8 ac.	0.3 ac.	Significant grading on natural hillside @ College Reach C. Impacts Detention Basin BJB.
4. Cannon #2 with College #4	4.1 ac.	Yes	Yes	Yes	No	No	10.4 ac.	0.3 ac.	
5. Cannon #2 with College #5	4.2 ac.	Crosses creek 300 ft. north of LBV sighting, but isolates LBV sighting location	Yes	Yes	No	No	10.3 ac.	0.3 ac.	
6. Cannon #2 with College #6	4.0 ac.	Yes	Yes; Parallel route impacts 1,800 ft. length of Calavera Creek	Yes	No	No	9.8 ac.	0.3 ac.	Significantly more grading on natural hillside @ College Reach C

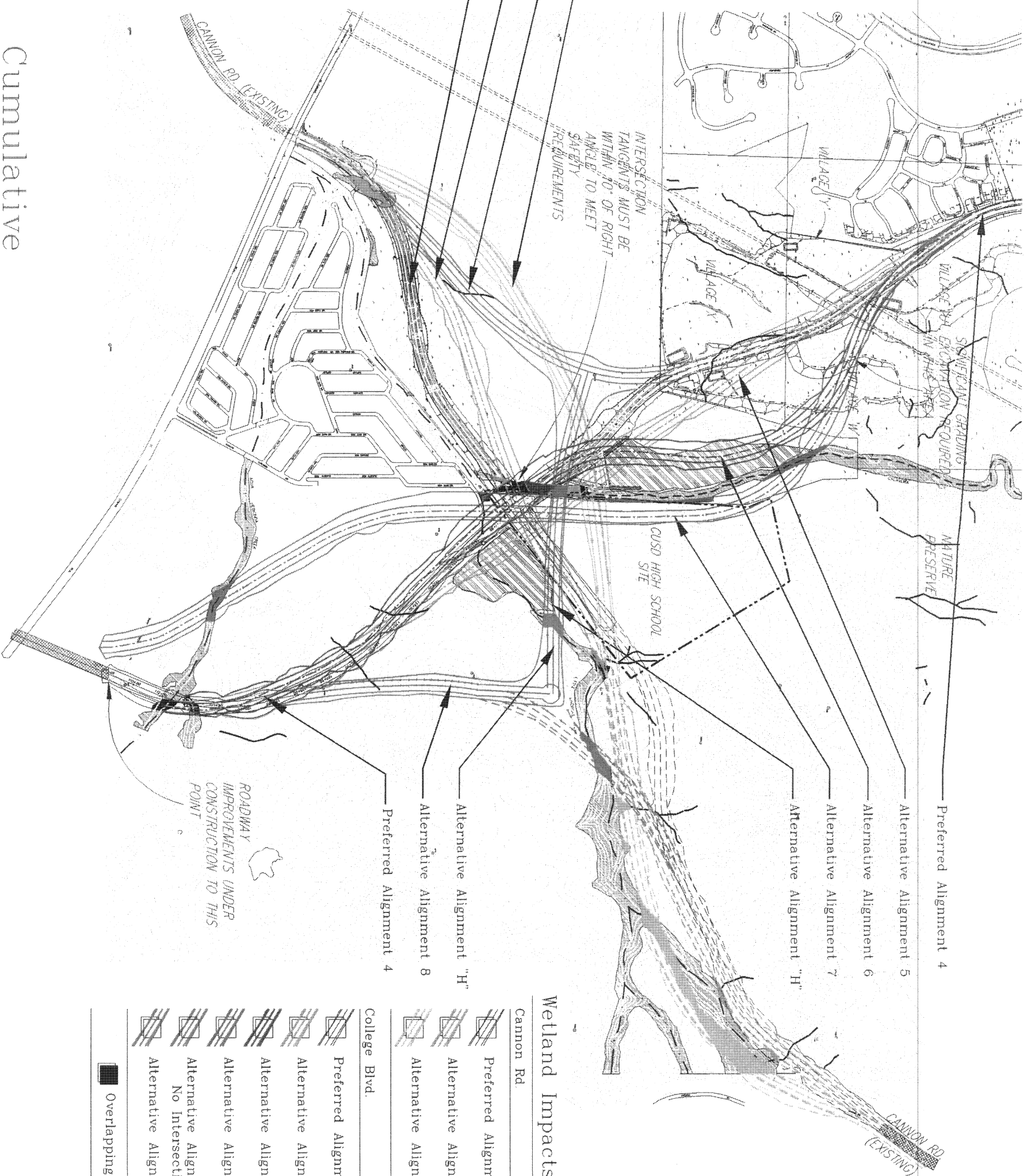
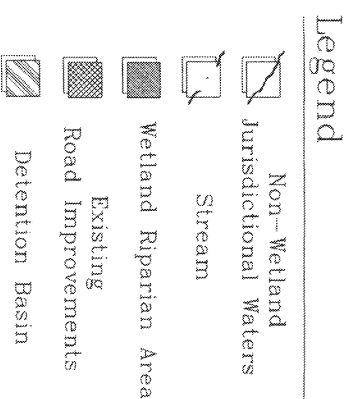
<sup>1</sup> Only Roadway Combination alternatives that comply with City safety standard of maximum 10° intersection tangent included in analysis.

<sup>2</sup> Impact acreage includes both permanent and temporary impacts. Also includes 0.3 acres of Calavera Hills Phase II wetlands/waters permanent impacts.



















<sup>3</sup> LBV is migratory species which travels southward during Fall/Winter. A single LBV pair was observed within Calavera Creek near mobile home park during Spring 2000 surveys.

<sup>4</sup> Additional acreage of wetlands/waters impacts resulting from eventual connection of Cannon Rd. Reach 4B to east roadway stub.

Roadway Combination	Wetlands / Waters Impacts	Impacts to Year 2000 LBV Sighting Location	Noise Impacts to Year 2000 LBV Sighting Location	Access to High School site	Regional Traffic LOS Failures	Impacts to Agua Hedionda Lagoon	CSS Impacts (Roadways only)	Future Cannon Rd. Reach 4B Wetlands / Waters Impacts	Other Considerations
7. Cannon #3 with College #6	4.1 ac.	Yes; Also leaves 400 ft. isolated riparian island not counted as impact.	Yes; Parallel route impacts 1,800 ft. length of Calavera Creek	High school not viable due to bisecting public street	No	No	9.8 ac.	2.6 ac.	Significantly more grading on natural hillside @ College Reach C. Bifurcates Robertson Ranch and thus impacts developability. Cannon Reach 3 alignment will impact significantly more wetlands on future Reach 4.
8. Cannon #3 with College #7	4.4 ac.	No	Yes; Parallel route impacts 2,000 ft. length of Calavera Creek	High school not viable due to bisecting public street	No	No	9.5 ac.	2.9 ac.	Significantly more grading on natural hillside @ College Reach C. Bifurcates Robertson Ranch and thus impacts developability. Cannon Reach 3 alignment will impact significantly more wetlands on future Reach 4.
9. "No Intersection" alternative	2.5 ac. +	Not by this project, however access to high school will likely impact wetlands	No; However access to high school site may impact LBV	Separate access to high school will be needed.	Yes	Yes; Probable wetland impacts at other offsite intersections also	11.5 ac.	2.1 ac. +	Unknown impacts to several offsite intersection widenings necessary. Separate detention basins berm included in impacts.
10. "Alternative H"	3.4 ac.	Crosses creek 200 ft. north of LBV sighting, but isolates LBV location	Yes	Yes	No	No	12.0 ac.	1.7 ac.	Crosses three separate riparian corridors. Modification needed to Basin BJ.



## Wetland Impacts

Cannon Rd.		Impacted Area
	Preferred Alignment 1	
	Alternative Alignment 2	
	Alternative Alignment 3	
College Blvd.		
		Impacted Area
	Preferred Alignment 4	
	Alternative Alignment 5	
	Alternative Alignment 6	
	Alternative Alignment 7	
	Alternative Alignment 8	
	No Intersection	
	Alternative Alignment "H"	
 Overlapping Wetland Impacts		

# Cumulative Roadway Alignment Alternatives Analysis Cannon Rd. & College Blvd., Carlsbad, California





Wetland Impacts	
Cannon Rd.	Total Impacts
<div></div> Preferred Alignment 1	1.8*
<div></div> Alternative Alignment 2	2.1
<div></div> Alternative Alignment 3	4.6
College Blvd.	
<div></div> Preferred Alignment 4	1.6*
<div></div> Alternative Alignment 5	1.7
<div></div> Alternative Alignment 6	1.7
<div></div> Alternative Alignment 7	2.0
<div></div> Alternative Alignment 8	4.1
<div></div> No Intersection	
<div></div> Overlapping Wetland Impacts	

\* Cumulative impact location information for alignment 1 & 4 is shown in Exhibit B.

#00117 AUGUST 2009

NORTH Scale 1" = 400'

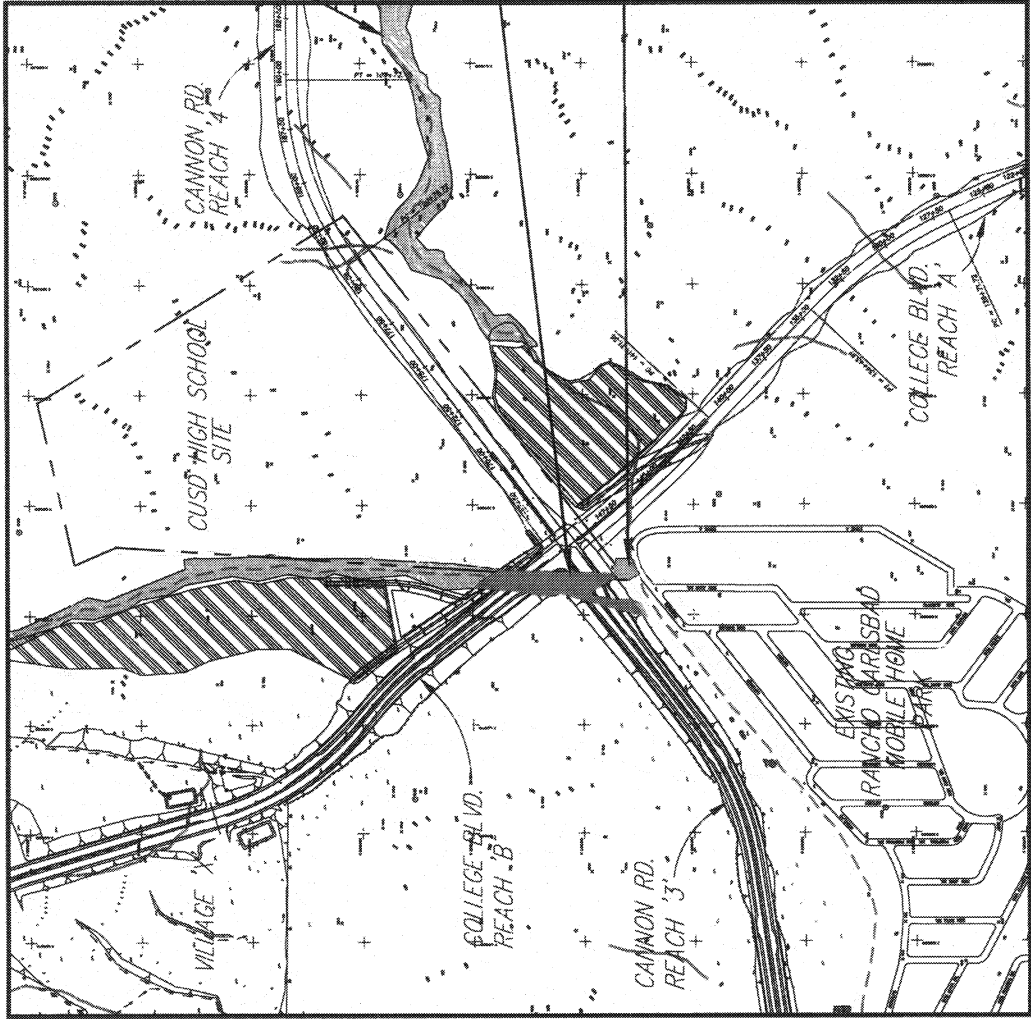
1420 PASEO DEL MAR, SUITE 200, CARLSBAD, CA 92008  
TEL: 760.439.8800 FAX: 760.439.8801  
WWW.DYNAMICENGINEERING.COM

# Exhibit A Roadway Alignment Alternatives Analysis Cannon Rd. & College Blvd., Carlsbad, California

*o'day*

DYNAMIC ENGINEERING  
1420 PASEO DEL MAR, SUITE 200  
CARLSBAD, CA 92008  
TEL: 760.439.8800  
WWW.DYNAMICENGINEERING.COM



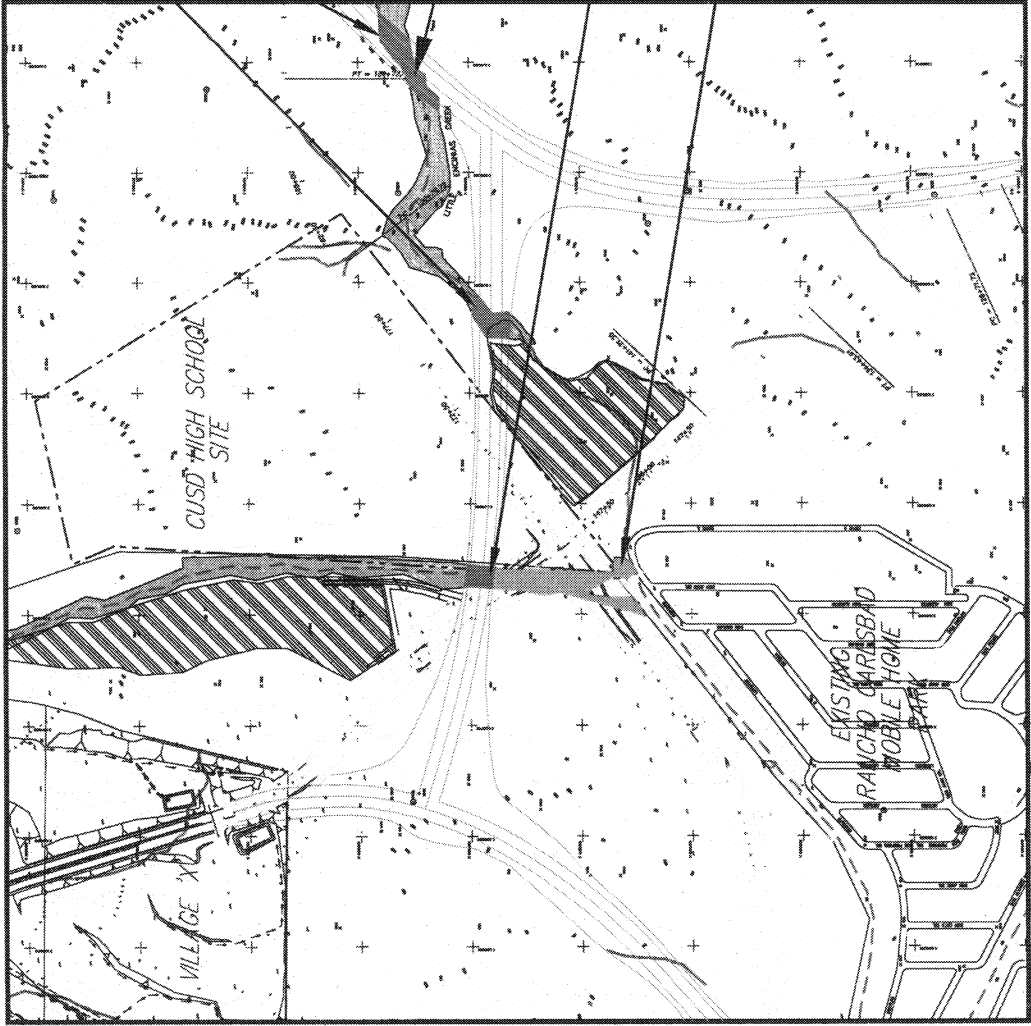


- Little Encinas Creek  
0.00 acres impacts
- Calavera Creek  
1.51 acres impacts
- Isolation of Wetlands  
0.19 acres impacts

Alternative B-1

Denotes current proposed roadway alignment.

- Wetland Impacts (in acres)
- 1.51 impacts @ Calavera Creek
  - 0.00 impacts @ Little Encinas Creek
  - 0.19 impacts @ isolated wetlands
  - 1.70 Wetland Impacts



- Little Encinas Creek  
0.49 acres impacts
- Little Encinas Creek  
0.82 acres impacts
- Calavera Creek  
0.29 acres impacts
- Isolation of wetlands  
1.63 acres impacts

Alternative H

Denotes Alternative "H" roadway alignment.


- Wetland Impacts (in acres)
- 0.29 impacts @ Calavera Creek
  - 1.31 impacts @ Little Encinas Creek
  - 1.63 impacts @ isolated wetlands
  - 3.23 Wetland Impacts


Legend

- Disturbed Wetland Area
- Isolation of Wetland Area
- Undisturbed Wetland Area
- Desiltation Basin Area

#991147


JAN, 4 2002


  
NORTH

  
Scale: 1" = 400'

# Intersection Location Alternatives Analysis

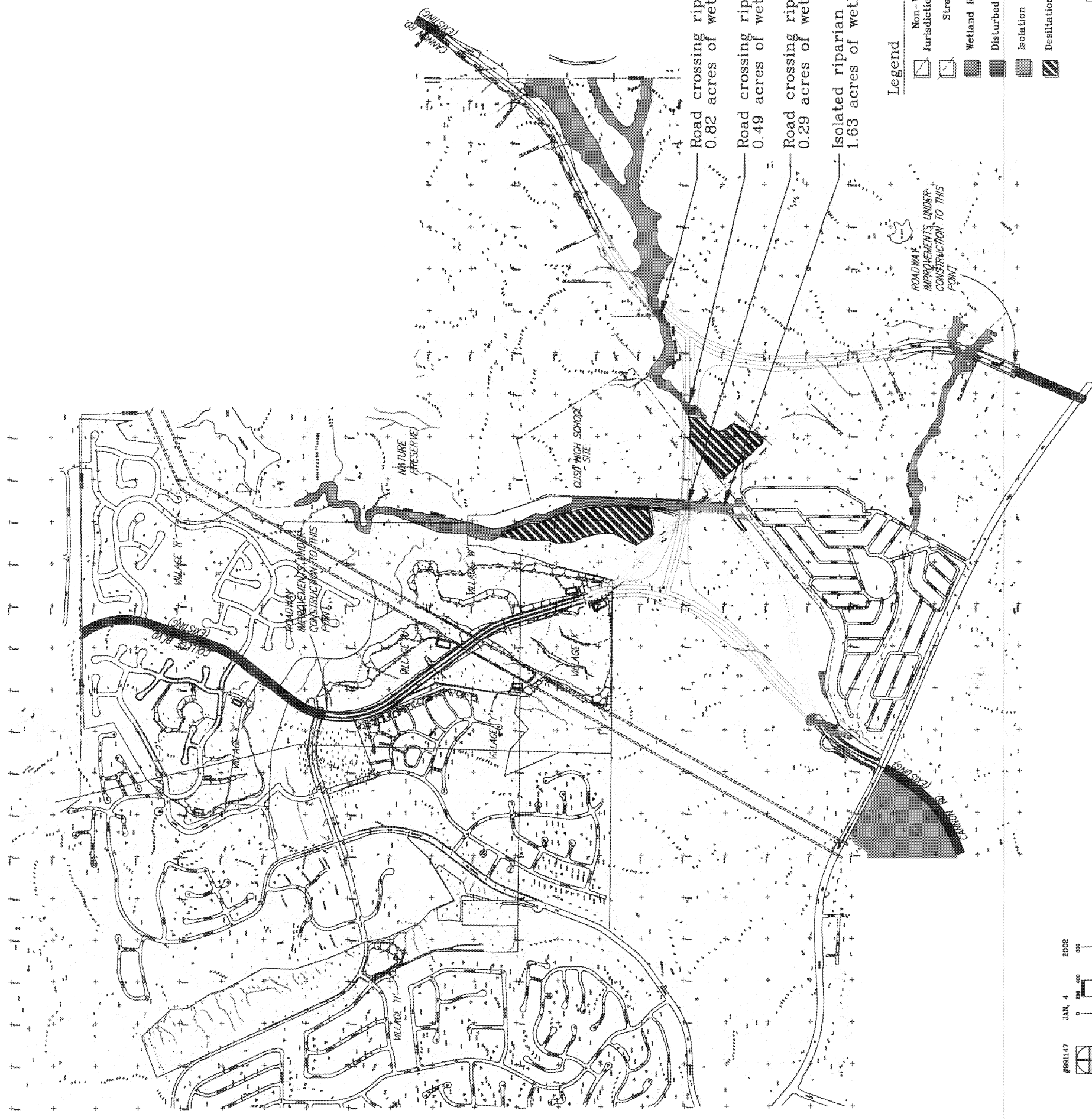
## Cannon Rd. & College Blvd. Intersection, Carlsbad, California

  
CONSULTANTS

  
PLANNING  
SYSTEMS

LAND USE PLANNING  
LAND DEVELOPMENT  
ENVIRONMENTAL MITIGATION

1650 PARADISE AVENUE, SUITE 300, CARLSBAD, CA 92008  
(760) 439-0700 FAX (760) 439-9744



Road crossing riparian habitat  
0.82 acres of wetland impacts

Road crossing riparian habitat  
0.49 acres of wetland impacts

Road crossing riparian habitat  
0.29 acres of wetland impacts

Isolated riparian habitat  
1.63 acres of wetland impacts

- Legend**
- Non-Wetland Jurisdictional Waters
  - Stream
  - Wetland Riparian Area
  - Disturbed Wetland Area
  - Isolation of Wetland Area
  - Desilting Basin Area



# Alternative "H" Wetland Impacts Regional Perspective

#981147

JAN. 4 2002

NORTH

Scale: 1" = 400'

PLANNING SYSTEM

DESIGNED BY: [Signature]  
CHECKED BY: [Signature]  
DATE: 01/04/02

**TY·LIN INTERNATIONAL · MCDANIEL**

August 2, 2001

McMillin Commercial  
2727 Hoover Avenue  
National City, CA 91950

Attention: Mr. Don Mitchell

Subject: College Boulevard at Cannon Road  
Preliminary Bridge Type Selection Study

Dear Don:

As per our proposal dated July 31, 2001, we have conducted a preliminary bridge study regarding the College Boulevard at Cannon Road Channel Crossing. Following are our findings regarding this study.

**Project Description**

Immediately to the west of the intersection of College Boulevard and Cannon Road in the city of Carlsbad is a channel containing a potentially environmentally sensitive wetland. T.Y. Lin International has studied the feasibility of crossing this channel with two bridges, one for each road mentioned, on a 40 degree to 50 degree skew. The Cannon Road Bridge will be approximately 120 feet wide and will average approximately 243 feet long. The College Boulevard Bridge will be approximately 114 feet wide and will average approximately 240 feet long. These dimensions vary throughout the structure due to alignment and skew, and which were based on preliminary drawings provided by O'Day Consultants. The two bridges will share an abutment at the east end and will be connected together with a slab to provide space for the sidewalk as shown on those drawings. The water surface elevations for a 100-year event, also provided by O'Day Consultants, were used in determining the maximum allowable structure depths. We were also informed that there would be three 16" utility lines crossing the Cannon Road Bridge and a 12" and a 16" utility line crossing the College Blvd. Bridge.

**Summary of Alternatives**

The following three preliminary alternatives were considered as structurally feasible for this project.

- Alternative 1: Cast-in-place concrete slab bridge on driven pile bents with pile extensions. Cannon Road Bridge - 7 spans, College Blvd. Bridge - 6 spans.
- Alternative 2: Cast-in-place post-tensioned concrete box girder bridge on multi-column bents founded on driven pile footings. Both structures - 3 spans.
- Alternative 3: Precast prestressed concrete I-girder bridge on cast in place multi-column bents founded on driven pile footings. Both structures - 3 spans.

Preliminary construction cost estimates have been completed for each of the alternatives studied. These costs include only the bridge construction specifically, and do not include channel grading, approach fills, roadway or utility construction, striping, traffic control, etc. Following is a summary of the estimated costs for each alternative.



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<i>Preliminary Construction Cost Estimate</i>	<b>Alternative 1 Slab Bridge</b>	<b>Alternative 2 CIP PS Box Girder</b>	<b>Alternative 3 PC PS I-Girder</b>
<b>Cannon Road Bridge</b>			
Estimated Cost/SF	\$100	\$120	\$145
Total Cost	\$2,916,000	\$3,499,200	\$4,228,200
<b>College Blvd Bridge</b>			
Estimated Cost \$/SF:	\$100	\$120	\$145
Total Cost:	\$2,622,000	\$3,146,400	\$3,801,900
<b>Connecting Slab</b>			
Total Cost:	\$10,000	\$12,000	\$12,000
<b>Total Bridge Cost</b>	<b>\$5,548,000</b>	<b>\$6,657,600</b>	<b>\$8,042,100</b>

**Alternative Details****Alternative 1:**

The cast-in-place concrete slab bridge would be a 7 span, 21" thick reinforced concrete slab with a maximum span of around 42'. It was assumed that the foundation to be used would be driven concrete piles, which would be extended to the elevation of the bridge slab. Many factors that are currently unknown could change the foundation type, such as potential scour or feasibility of driving piles due to soil type. Changing the foundation type could potentially increase the cost of this alternative.

This alternative would temporarily impact all of the area under the structure due to the required equipment access for driving piles. Also, the bridge would be cast on falsework, which would be placed in the channel bottom. An area roughly 30' - 40' on one or both sides of each bridge would also be required for equipment access, such as concrete pumps, cranes, excavators and equipment used for removing the falsework. Limiting construction access, which will drive up the cost of the structure, could decrease this width. The only permanent impact under the bridge would be the presence of support piles as well as the shading caused by the structure. Piles could be replaced with pier walls, which would reduce the amount of debris that would collect under the bridge, but pier walls on such a wide bridge also create a "tunnel" effect, cutting down on the amount of light that gets under the bridge. Due to the low amount of flow, we feel that pile extensions are preferable over pier walls.

The utilities crossing the structures would require the placement of casings on the sides of the bridge, requiring that the ultimate right-of-way be increased accordingly on the sides of the bridge. These utility casings would be too large to place inside the concrete slab.

**Alternative 2:**

The cast-in-place post-tensioned concrete box girder bridge would be a 3 span, 4' deep box girder bridge with a maximum span of around 100'. It was assumed that the foundation to be used would be cast-in-place concrete columns, 5 per bent (total of 10 columns for each bridge). These columns would be on concrete pilecaps, founded on driven piles. Similar to Alternative 1, many factors that are currently unknown could change the foundation type, such as potential scour or feasibility of driving piles due to soil type. Changing the foundation type could potentially increase the cost of this alternative.

This alternative would temporarily impact most of the area under the structure due to the required equipment access for driving piles. Also, the bridge would be cast on falsework, which would be placed in the channel bottom. It is possible that small areas under the structure could be protected and spanned with the falsework, but it is estimated that at least 70% of the area would still be impacted. An area roughly 30' - 40' on one or both sides of each bridge would also be required for equipment access, such as concrete pumps, cranes, excavators and equipment used for removing the falsework. Limiting construction access, which will drive up the cost of the structure, could decrease this width. The only permanent impact under the bridge would be the presence of ten columns and footings as well as the shading caused by the structure.

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The utilities crossing the structures would require the placement of casings on the sides of the bridge, suspended under the overhangs of the bridge. No additional right-of-way would be required due to the utilities, except perhaps at the abutments. These utility casings would be too large to place inside the interior bays of the bridge without extensive changes to the typical design requirements, such as larger bentcaps, greater reinforcing, closer column spacing requiring additional columns, etc.

### Alternative 3:

The precast, prestressed concrete I-girder bridge would be a 3 span structure with a maximum span of around 90'. The structure depth would be between 4.25' and 4.5'. The concrete deck would be cast-in-place concrete cast on forms supported on the precast girders. Similar to Alternative 2, it was assumed that the foundation to be used would be cast-in-place concrete columns, 5 per bent (total of 10 columns for each bridge). These columns would be on concrete pilecaps, founded on driven piles. Similar to Alternatives 1 and 2, many factors that are currently unknown could change the foundation type, such as potential scour or feasibility of driving piles due to soil type. Changing the foundation type could potentially increase the cost of this alternative.


This alternative would temporarily impact most of the area under the structure due to the required equipment access for driving piles. No falsework would be required for the placement of the superstructure, only for the construction of the bentcaps at each bent, thus would only impact a width of around 20' at each bent (2 locations per bridge). It is possible that areas between bents under the structure could be protected, but some equipment access would be needed for the cranes that are used to set the precast girders. It is estimated that at least 60% of the area would still be impacted. An area roughly 30' - 40' on one or both sides of each bridge would also be required for equipment access, such as concrete pumps, cranes, excavators and equipment used for removing the bent falsework and deck formwork. Limiting construction access, which will drive up the cost of the structure, could decrease this width. The only permanent impact under the bridge would be the presence of ten columns and footings as well as the shading caused by the structure.

The utilities crossing the structures would require the placement of casings suspended under the overhangs of the bridge, or suspended between girders. No additional right-of-way would be required due to the utilities, except perhaps at the abutments.

Please feel free to contact Jim Rucker or myself regarding our findings stated above. We look forward to working with you on this project in the future.

Best Regards,

T.Y. Lin International ■ McDaniel

  
Wade Durant, P.E.  
Senior Bridge Engineer

cc: Keith Hanson, O'Day Consultants, Fax (760) 931-8680